Customer No. 30734

What is claimed is:

1. A semi-solid metal (SSM) casting process, comprising:

heating a first Al-Si hypereutectic alloy to a first temperature;

combining a second Al-Si hypereutectic alloy having a second temperature with the first Al-Si hypereutectic alloy to form a semi-solid metal;

cooling the combined first and second Al-Si hypereutectic alloy for a determined length of time, wherein the time can be zero; and,

casting the semi-solid metal.

- 2. An SSM casting process according to claim 1, further comprising combining a third Al-Si hypereutectic alloy with the first and second Al-Si hypereutectic alloys.
- An SSM casting process according to claim 1, wherein each of the hypereutectic alloys has the same chemical composition.
- 4. An SSM casting process according to claim 1, wherein one of said hypereutectic alloys comprises Si in a range from about 14 percent to about 20 percent.
 - 5. An SSM casting process according to claim 1, wherein one of said

Docket No. 87324.1760 Customer No. 30734

hypereutectic alloys comprises Si in a range from about 16 percent to about 18 percent.

- 6. An SSM casting process according to claim 1, further comprising heating said first Al-Si hypereutectic alloy to liquid state.
- 7. An SSM casting process according to claim 1, further comprising heating said second Al-Si hypereutectic alloy.
 - 8. An SSM casting process according to claim 1, wherein the temperature of said first Al-Si hypereutectic alloy is higher than the temperature of said second Al-Si hypereutectic alloy such that there is a difference in temperature between the first and second Al-Si hypereutectic alloys.
 - 9. An SSM casting process according to claim 8, wherein the difference in temperature is chosen to achieve a determined rate of cooling.
 - 10. An SSM casting process according to claim 8, wherein the temperature of said second Al-Si hypereutectic alloy is room temperature.
 - 11. An SSM casting process according to claim 8, wherein said first and second Al-Si hypereutectic alloys have the same chemical composition.

- 12. An SSM casting process according to claim 8, wherein the difference in temperature of the first and second Al-Si hypereutectic alloys is chosen to achieve a faster rate of cooling of the hotter A1-Si hypereutectic alloy as compared to heating the hotter Al-Si hypereutectic alloy and allowing the hotter Al-Si hypereutectic alloy to cool independently at room temperature.
- 13. An SSM casting process according to claim 8, wherein the difference in temperature is chosen to achieve a cast product with primary Si particles that are more uniformly dispersed than a cast product made by a conventional SSM casting process.
- 14. An SSM casting process according to claim 8, wherein the difference in temperature is chosen to achieve a cast product comprising Si particles having less than an average diameter of about 60 microns.
- 15. An SSM casting process according to claim 8, wherein the difference in temperature is chosen to achieve a cast product comprising Si particles having less than an average diameter of about 40 microns.
- 16. An SSM casting process according to claim 1, wherein the first Al-Si hypereutectic alloy is heated to a temperature ranging from about 630°C to

about 800°C.

- 17. An SSM casting process according to claim 16, wherein the first Al-Si hypereutectic alloy is heated to about 760°C.
- 18. An SSM casting process according to claim 7, wherein the second Al-Si hypereutectic alloy is heated to a temperature ranging from about 22°C to about 640°C.
- 19. An SSM casting process according to claim 1, wherein first Al-Si hypereutectic alloy is a 390 alloy.
- 20. An SSM casting process according to claim 3, wherein each of the hypereutectic alloys is a 390 alloy.